



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/773,610

02/06/2004

Akira Yamanaka

17475US02

7768

23446 7590 10/30/2009
MCANDREWS HELD & MALLOY, LTD
500 WEST MADISON STREET
SUITE 3400
CHICAGO, IL 60661

EXAMINER

BAYARD, EMMANUEL

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

10/30/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/773,610	Applicant(s) YAMANAKA ET AL.	
	Examiner Emmanuel Bayard	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is in response to amendment filed 7/8/09 in which claims 1-17 are pending. The applicant's arguments have been fully considered but they are not persuasive enough to overcome the rejection of Kim in view of Russel therefore this case is made final. (See Examiner response to argument s below).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-8, 10-13 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al U.S. Pub No 20040131109 A1 in view of Russel et al U.S. Patent No 6,088,390.

1. As per claim 1, Kim et al teaches a method for equalization in a communications system, the method comprising: Decision feedback equalizer that is used for removing post cursor inter-symbol interference (See fig.1b element 16 and abstract and paragraph [0016-0017]) in a block code based error correction scheme (see fig.1.b element 92 and paragraphs [0024] and [0046-53] and page 7, lines 27-30); wherein said block code based error correction scheme is utilized in the communication system (see paragraph [0010-0013]).

2. However Kim does not teach removing post cursor inter-symbol interference **within at least one error correction code word** in a block code.

Art Unit: 2611

3. Russel et al teaches a DFE for removing post cursor inter-symbol interference **within at least one error correction code word** in a block code (see fig.5 element 504 and 506 and abstract and col.1, lines 45-67 and col.2, lines 18-40 and col.5, lines 1-35).

4. It would have been obvious to one of ordinary skill in the art to implement the teaching of Russel into Kim as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

5. As per claim 2, Kim et al and Russell in combination would teach, wherein said removing of post cursor inter-symbol interference comprises removing symbol interferences from at least one previous error correction code word utilizing a decision feedback equalization filter (See Kim fig.1b element 16 and abstract and paragraph [0016-0017]) as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claim 3, Kim et al teaches, wherein said removing of post cursor inter-symbol interference comprises utilizing distortion filtering in said decision feedback equalization filter, for generating filtered symbols (see paragraphs [0008], [0050]).

As per claim 5, As per claim 2, Kim et al and Russell in combination would teach, wherein said removing of post cursor inter-symbol interference comprises adding scalar terms (see Kim fig.1b element 15 or output of element 16) for each of said at least one error correction code word to a decision metric (see Kim paragraphs [0035], [0052]) of a real part of a projection of said filtered symbols to said at least one error

Art Unit: 2611

correction code word as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

6. As per claim 6, Kim et al teaches A system for equalization in a communications system see paragraph [0010-0013]), the system comprising: a modulation system (see paragraphs [0015] [0030]) utilizing a block code based error correction scheme (see fig.2 element 200 and col.3, lines 16-20); and a feedback equalization filter (See fig.1b element 16 and abstract and paragraph [0016-0017] provided within said modulation system for removing post cursor inter-symbol interference to(see fig.1.b element 92 and paragraphs [0024] and [0046-53] and page 7, lines 27-30) make at least one decision in said block code based error correction scheme.

7. However Kim does not teach removing post cursor inter-symbol interference **within at least one error correction code word** in a block code.

8. Russel et al teaches a DFE for removing post cursor inter-symbol interference **within FEC (forward error correction) code word** in a block code (see fig.5 element 504 and 506 and abstract and col.1, lines 45-67 and col.2, lines 18-40 and col.5, lines 1-35).

9. It would have been obvious to one of ordinary skill in the art to implement the teaching of Russel into Kim as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

10.

Art Unit: 2611

11. As per claims 7, 12 Kim et al and Russell in combination would teach, wherein said feedback equalization filter removes symbol interferences from at least one previous error correction code word (See Kim fig.1b element 16 and abstract and paragraph [0016-0017]) as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claims 8, 13 Kim et al teaches, wherein said feedback equalization filter comprises a distortion filter that generates filtered symbols (see paragraphs [0008], [0050]).

12. As per claims 10, 15 Kim et al and Russell in combination would teach comprising a decision metric (see paragraphs [0035], [0052]) for said feedback equalization filter, wherein scalar terms are added (see fig.1b element 15 or output of element 16 for each of said at least one error correction code word to a decision metric of a real part of a projection of said filtered symbols to said at least one error correction code word as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claim 11, Kim et al teaches a method for equalization in a communications system, the method comprising: performing block code based error correction during signal modulation in the communications system; and making at least one decision with minimum error power-based criteria during said block code based error correction with a decision feedback equalization filter that removes post cursor inter-symbol interference. (See rejection of claim 1 above. Also note that DFE (decision

Art Unit: 2611

feedback equalizer is well known in the art to MMSE (Minimum mean square error) or LMSE (Least mean square error) to generate minimum error power.

13. However Kim does not teach removing post cursor inter-symbol interference **within at least one error correction code word** in a block code.

14. Russel et al teaches a DFE for removing post cursor inter-symbol interference **within at least one error correction code word** in a block code (see fig.5 element 504 and 506 and abstract and col.1, lines 45-67 and col.2, lines 18-40 and col.5, lines 1-35).

15. It would have been obvious to one of ordinary skill in the art to implement the teaching of Russel into Kim as to accurately obtain the desired bit error rate as taught by Russell (see col.4, line 67-col.5, line 1).

As per claim 16, Kim et al teaches, wherein said block code based error correction scheme is utilized in a modulation system of the communication system (see paragraph [0010-0013], [0015] [0030]).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 4, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al U.S. Pub No 20040131109 A1 in view of Russel et al U.S. Patent No 6,088,390 in further view of Yen U.S. Pub No 2003/0123,586 A1.

As per claims 4, 9 and 14, Kim et al and Russel in combination teach all the features of the claimed invention except wherein utilizing distortion filtering further comprises inserting a matrix multiplication-based filter after a feed forward equalizer filter and a feedback filter in the modulation system for symbol interference from the symbols in previous error correction code words.

Yen teaches inserting a matrix multiplication device is the same as the claimed (a matrix multiplication-based filter) after a feed forward equalizer filter and a feedback filter in the modulation system for symbol interference from the symbols in previous error correction code words (see fig.5 element 542 and page 1 [0011] and page 3 [0032-00035]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Yen into Kim et al and Russel combination as to make the maximum possible detection and increase the capability of receiving as taught by Yen (see page 4 [0037]).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al U.S. Pub No 20040131109 A1 in view of Russel et al U.S. Patent No 6,088,390 in further view of Wei et al U.S. Pub no 2004/0125884 A1.

As per claim 17, Kim et al and Russel in combination teach all the features of the claimed invention except selecting a code word for said block code based error correction scheme, based on said removing of post cursor inter-symbol interference within said at least one error correction code word.

Wei et al teaches selecting a code word for said block code based error correction scheme, based on said removing of post cursor inter-symbol interference within said at least one error correction code word (see page 1 [0004-0005], [0011]).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Wei into Kim et al and Russel as to provide tentative decisions designated to find symbol from the signal constellation closest to the ideally ISI free receive signal sample as taught by Wei (see page 2 [0014]).

Response to Arguments

1. Applicant's arguments filed 7/8/09 have been fully considered but they are not persuasive.
2. First in pages 9-10, paragraph 6 of the response, applicant asserts that figure 6 paragraphs [0024 and [0053] of Kim is silent with the process of removing post-cursor ISI (inter-symbols).
3. Examiner respectfully disagrees.
4. In fact Kim fig.1b element 16 clearly discloses a DFE which is coupled to output codeword decision detection (fig.1b element 92 and paragraph [0015] and [0035]) to

Art Unit: 2611

remove post-cursor ISI (inter-symbols) ([0024]) therefore applicant's arguments are moot as regard to Kim and this case is made final.

5. Second in page10 paragraph 2 , applicant asserts that Russel does not teach removing post-cursor ISI (inter-symbols) based on error correction code word.

6. Examiner respectfully disagrees.

7. In fact Russel figs. 1 and 3 clearly disclose a DFE within an FEC (forward error correction) device to suppressed ISI (inter-symbols) (see col.1, lines 45-67 and col.5, lines 1-25) therefore applicant's arguments are moot as regard to Russel and this case is made final.

8. Third in page 10, paragraph 3, applicant asserts that the combination of Kim and Russel fail to establish prima facie of obviousness.

9. Examiner respectfully disagrees.

10. In response to applicant's argument that **the combination of Kim and Russel fail to establish prima facie of obviousness**, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

11. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

Art Unit: 2611

USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 571 272 3016. The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571 272 3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

10/30/2009

Emmanuel Bayard
Primary Examiner
Art Unit 2611

/Emmanuel Bayard/
Primary Examiner, Art Unit 2611